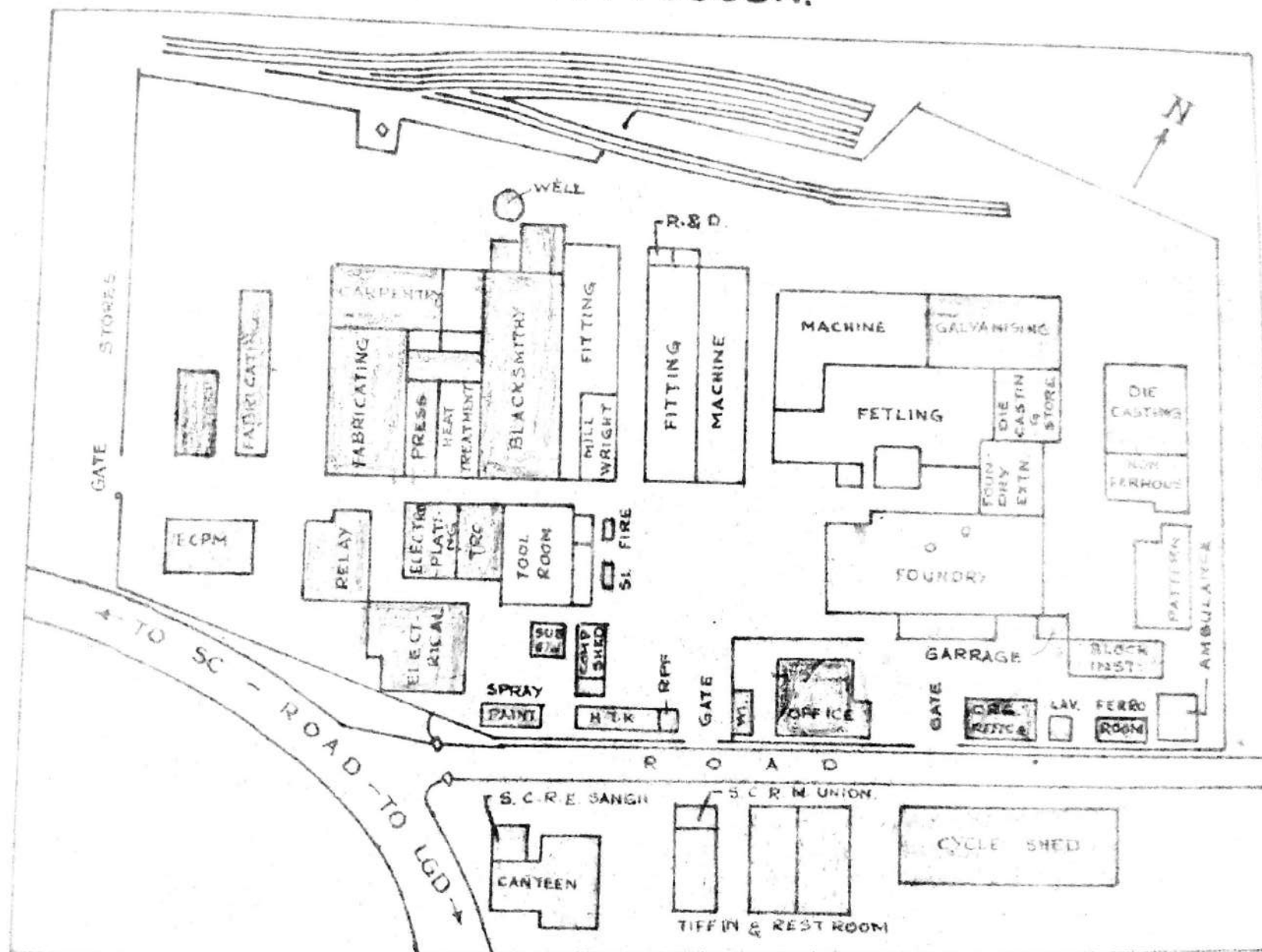


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1. Layout of the S & T Workshops at Mettuguda, Secunderabad.
2. Origin and growth of S & T Workshops.
3. Organisational set-up.
4. Production.
5. Production Control Organisation consisting of (i) Progress, (ii) Inspection, and (iii) Rate-fixing sections.
6. Foundry Shop.
7. Machine Shop.
8. Mechanical Fitting Shop.
9. Tool Room & Millwright Shop.
10. M & P Programmes.
11. R & D Section.
12. Electrical Group comprising of :
 - (a) Production Shops for :
 - i) Electrical Fitting,
 - ii) Electrical Signal Lamp Section,
 - iii) Electroplating & Die-casting sections,
 - iv) Track Recording Car section.
 - A n d
 - (b) Overhauling Shops for :
 - i) Block, Signal Machines and Reversers,
 - ii) Relays,
 - iii) Wayside station Selectors,
 - iv) Teleprinters.
13. Mechanical Fabricating section consisting of :
 - (a) Blacksmithy Shop, (b) Fabricating Shop, and
 - (c) Carpentry Shop.
14. Basic Training School.
15. Welfare activities.
16. Summary of Salient features.

SIGNAL & TELE-COMMUNICATION WORKSHOPS. METTUGUDA.



ORIGIN AND GROWTH :

The Signal & Telecommunication Workshops, Mettuguda, has a glorious record of dedicated service of well nigh 60 years to the Indian Railways.

2. Designed and established first as an Engineering Workshop in the 1920s by the Ex. Nizam State Railway with a working strength of about 200 members of staff, it was manufacturing for the P. Way, steel sleepers, points & crossings besides the civil engineering items like the furniture, wheel barrows, lavatory pans, pre-fabricated latrines, R.C.C. beams, roof slabs, hollow bricks, and flooring slabs for station platforms and buildings and finally carrying out the repairs to their motor trolleys, push trolleys and pumps.

3. All the way side stations were provided with key locking and ground lever frames on the present Secunderabad and Hyderabad divisions which were forming then the old N.S. Railway and this Workshop used also to manufacture the signalling materials for these installations.

4. With the formation of the Central Railway, this workshop went under the control of Bridge Engineer/Memmad and in the year 1951, a nucleus section for the repairs and maintenance of the signalling gears was created. The S & T Department of Central Railway took over this Shop in April 1956. Heavy line capacity works, Doubling of lines, extension of loops, raising the standards of interlocking at stations due to the implementation of 5-year plans - all necessitated the expansion of this Workshop by installing additional machinery and plant, deploying extra staff and restructuring the various sections so as to optimise the production and cope up with the increased workload.

5. An expansion programme of the Shops costing about Rs. 27 lakhs² was taken up and completed for the manufacture of electrical signalling equipments as part of the modernisation of signalling installations in the field. The scheme involved the procurement and installation of large number of machines, training of staff, making the jigs, dies and fixtures for various operations, planning the processes and institution of a new organisation and methods in advance so as to gear up the Shops to meet this challenge.

6. This workshop has the good fortune to receive the advice and guidance of Mr. Menne Terelius, a Swedish Expert, who after a thorough and exhaustive study in the year 1960 of the working of the Shops, submitted a report for the production of the electrical signalling materials. Thereafter, Mr. Toshio Watanabe, a Japanese Expert assisted the Shops in studying the various methods and processes and devising the ways and means to utilise fully the capacity so built up. Based on their valuable recommendations, this workshop which was producing primarily the mechanical signalling items, gradually changed over to the production of electrical signalling items like the Signal Machines, Electrical Detectors, Reversers and Colour Light Signal Units, etc.

7. The R.C.C. shop was liquidated and transferred to the Engr. Workshop at Secunderabad, and the size of the Carpentry shop was reduced only to cater for the requirements of signalling branch duly transferring the staff as surplus staff to the Mechanical Workshop, Lallaguda. Heat-treatment, protective coating sections and small analytical laboratory were also added to make the S & T Shops self-contained.

8. A die-casting section was opened in the year 1969 to manufacture the Zincs for AWC-2 and AM-4 required by all the Zonal Railways for use in the primary cells for signalling installations. Started with a production of 18000 unit pieces per year, the present production is around 2,00,000 pieces of AWC-2 and AM-4 Zincs put together.
9. The production of many items like the joints of all types and classes required by the Railway Electrification projects were taken up as a measure of import substitution. Similarly, the S & T Shops has been geared up to manufacture the line communication materials required by the Zonal Railways for construction of their own A.C.S.R. communication alignments.
10. With the increasing accent on modernisation of signalling assets and the institution of the sophisticated safety devices to ensure a speedy and safe rail travel, this workshop has to change its pattern of production and diversify its products to meet the challenges. It is perhaps the only S & T Workshop on the Indian Railways which produces the maximum number of items needed by the S & T Branch.
11. A small tool room with a few machines and nucleus staff in the Jig & Tool Design office was also opened to manufacture the dies, jigs and tools required for the day-to-day manufacturing processes in various sections.
12. The workshop has always been in the forefront in developing new and sophisticated items not only for S & T Department, but also of other departments. The crowning achievement of the Shops is the development and manufacture of Track Recording Cars to measure and record the parameters of the track under dynamic conditions. Other significant item employing the modern technology is the Electrically Lit Signal Lamp, replacing the time-honoured and conventional kerosene lamp.

4

13. Thus, the S & T Workshops, which has had its humble beginning as a small Engineering Shop, slowly became a full-fledged production workshop for the signalling branch. The total area of the workshop works out to 35,000 Sq. metres out of which total covered area is about 12,500 Sq. metres.

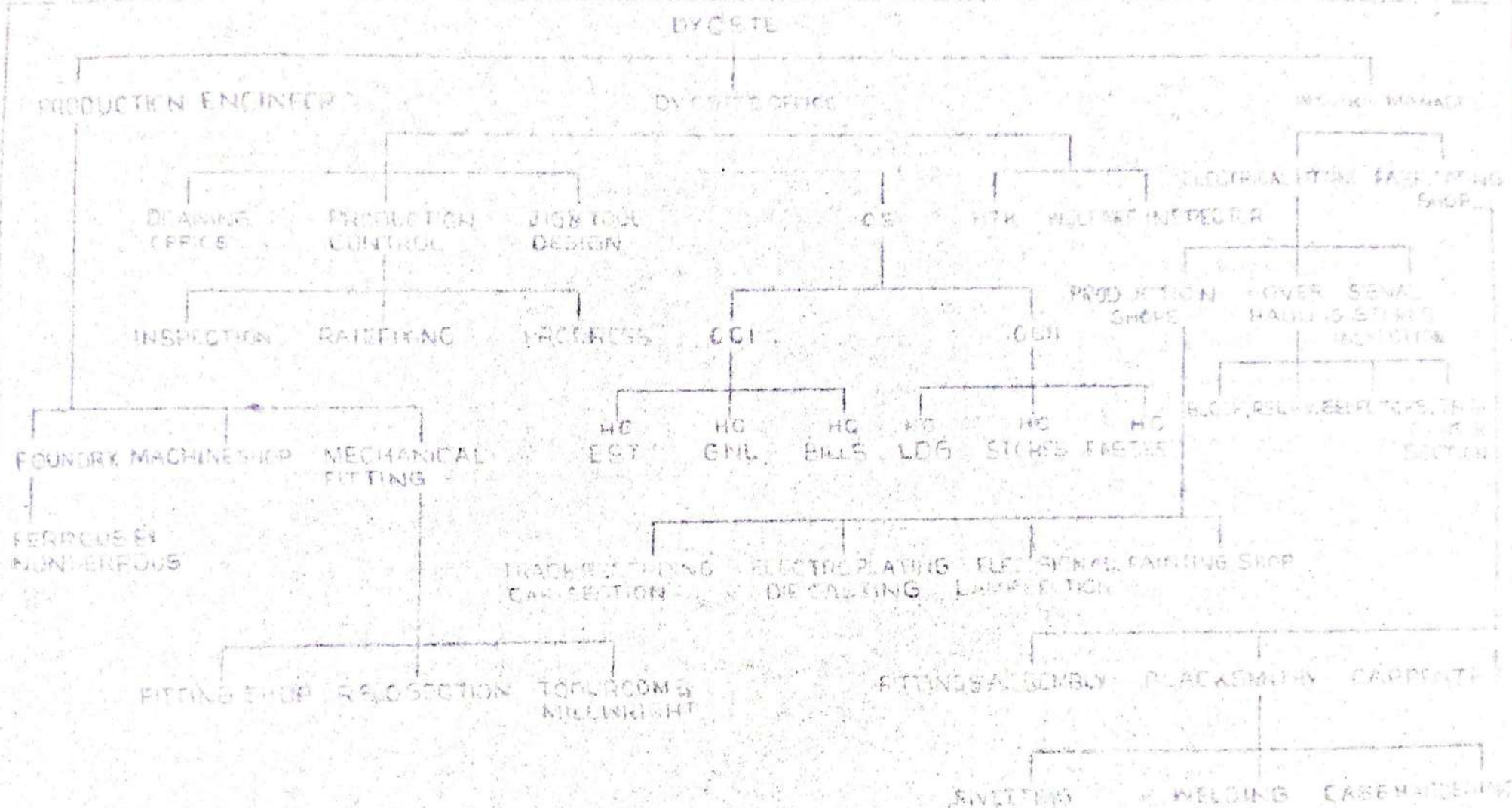
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ORGANISATIONAL SET-UP *****

The S & T Workshops is administered by a Dy.C.S.T.E. assisted by a Production Engineer, who is in-charge of the Foundry and Machine shops, Tool Room, Millwright, Mechanical Fitting and R & D Sections, rate-fixing, time-studies, Inspection activities of the Production Control Organisation; and a Works Manager who looks after the Electrical group sections, Fabricating, Rivetting, Smithy and Carpentry shops, the Progress and Planning activities of the Production Control Organisation, besides the administration of the Dy.C.S.T.E.'s office. The Dy.C.S.T.E. himself lays down the principles and programme of the works, co-ordinating the activities of production in various shops and of the supply of raw materials, and deals with the P.M.M. matters, budget and control, and finally with staff welfare.

The Shop organisation consists of 8 groups besides the Production Control, Quality control and testing sections, Jig and Tools Section and a laboratory for chemical and metallurgical analysis.

ORGANISATIONAL AND ADMINISTRATIVE SET UP OF THE SHOPS & OFFICE



Each group is managed by a Shop Superintendent in Gr. Rs. 840-1040, assisted by an Assistant Shop Superintendent and supported by Senior/Chargeman, Maistry, highly skilled staff in Grades I and II, skilled and semiskilled artisans and unskilled workmen.

The Dy. CST's Office is served by an Office Superintendent, assisted by two Chief Clerks, 7 Head Clerks, 30 Senior & 27 Junior Clerks; 1 Store-keeper and 2 Stores Chasers, deployed in Establishment, Bills, Pass, General, Ledger and Stores Sections. Part of the clerks work in the Time Office, and deal with the time-keeping duties concerning the workmen.

A well-equipped drawing office functions under the Chief Draughtsman, assisted by one Head Draughtsman, 4 Senior/Junior Draughtsmen, 3 tracers and a ferro-printer. A Jig & Tool Design Office with a Chief Jig and Tool Designer assisted by two Senior Jig and Tool Designers is functioning for the purpose of tool design, die-making, etc. Technical library containing a good number of books on technical and technological subjects; I.S., I.R.S. and other standard specifications, I.R.S. Drawings, periodicals and journals is attached to this drawing office.

The table attached illustrates the organisational and administrative set-up of the Shops and office of the S & T Workshops.

PRODUCTION;

The S & T Shops produces a wide range of signalling both mechanical and electrical materials. Perhaps it is the only railway workshop in the country which manufactures the highest number (as many as 500) of items. The demand for stepping up the variety and number of such products is ever on the increase.

On the electrical signalling side, the manufactured items like the AWC-2, AW-4 zines, Electrical Detectors and Reversers, Signal lamps, Circuit Controllers, Electrical Signal Machines, Colour Light Signal Units and Transformers, Point Machine fittings; and on the mechanical signalling front, the products like the Single and Double wire lever frames, Cranks of all types, Compensators, Trestles, Roller guides, Solid Joints of various types, Point Rods, Fulley Stakes, Stretchers and Lifting Barriers, Condenser Joints and host of other miscellaneous materials like the tanks and trolleys, etc., constitute the bulk of production which is ever on the increase as is evidenced by the following figures of yearly production :

Year.		Production Value.
1966-67	..	Rs. 42 lakhs
1967-68	..	Rs. 45 "
1968-69	..	Rs. 57 "
1969-70	..	Rs. 59 "
1970-71	..	Rs. 59 "
1971-72	..	Rs. 65 "
1972-73	..	Rs. 56 "
1973-74	..	Rs. 82 "
1974-75	..	Rs. 105 "
1975-76	..	Rs. 158 "
1976-77	..	Rs. 165 "
1977-78	..	Rs. 173 "
1978-79	..	Rs. 166 "
1979-80	..	Rs. 164 "

Monthly figures of production:

April 1980 .. Rs. 13,05,379/-

In response to the appeal made by the Hon'ble Minister of Railways Shri Kamalpathi Tripathiji, the workers rose to the occasion, extended their whole-hearted cooperation and put in their best efforts to step up the production to a value of

7

Rs.15.8 lakhs in May 1980 the highest monthly figure recorded for the last two years, namely 1978-79 and 1979-80. The production for June 1980 touched another record figure of Rs.16.04 lakhs.

May 1980 .. Rs.15,82,396/-

June 1980 .. Rs.16,04,402/-

The noteworthy feature of the production in this workshop is the continuance of the supply of the manufactured items at the same old rates as were obtaining in the year 1972-73, despite the escalation of prices of raw materials, increase in labour wages, hikes in the costs of energy and fuels and feeds; and heavy rise in prices of accessories.

In terms of Railway Board's letter No.2(LL)77/WFM/1-6 dated 27-6-1977, Shop Councils have been constituted for all the groups of Shops in the S & T Workshop for increasing the production, productivity and overall efficiency. They will also deal with safety measures, problems relating to absenteeism and physical conditions of working such as lighting, ventilation, noise, dust and reduction of fatigue, welfare and health measures. These councils meet every month.

Joint Councils have also been constituted with the representatives of the Administration and the recognised Labour Organisations to deal with the matters relating to the optimum production, efficiency, productive norms of men and machines, to review the functions of Shop Councils and to deal with matters relating to work, planning and achievement targets, etc. Important matters concerning the welfare of the workmen, their skills and adequate facilities for their training, institution of rewards for valuable and creative suggestions, optimum use of raw materials, quality of finished products and measures for eliminating pilferages, etc., also come within their purview. These Councils meet every three months.

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In addition, the Dy.C.S.T.E., F.E., W.M., and Shop Superintendents meet twice, firstly at the end of the month to draw up and finalise the Schedule of production for the following month, and secondly in the third week to review the production achieved and to modify the targets and quantum of materials to be produced vis-a-vis the progress.

PRODUCTION CONTROL ORGANISATION

Working under the aegis of the Production Engineer and the Works Manager, assisted by a Shop Superintendent and two Assistant Shop Superintendents, 2 Senior Chargemen, 1 Jr.Chargeman and a Maistry, a full-fledged Production Control Organisation exists, in addition to a rate-fixing section manned by 1 Asstt. Shop Superintendent, and 2 Sr.Chargemen for -

- (a) Pre-planning and production scheduling for evolving the best methods of production;
- (b) Preparation of process charts, flow charts and operational charts.

Process study involves the marshalling of thousands of different components and assemblies, analysis of the technical constraints limiting the flexibility of assembly or manufacture and capacity of the machine to complete a given process in a given time.

Route Cards illustrate the various operations involved and the shops through which any job has to go, so as to enable the formulation of machinery, materials and personnel required for optimum production.

(c) Conducting time studies: The essentials of any incentive working mostly depend on the time studies conducted for economy and effectiveness of production. These studies are periodically repeated depending on the skill of the workers and usage of different types of tools and materials, changes of methods

9

introduced for better utilisation of the tools or ease of manufacture in order to increase the production levels to accepted standards to effect economy and to fix up the rates or cost for each item of manufacture.

(d) Processing order schedules: Order scheduling is a systematic study of the initial points having an increased output or reduced production so as to enforce a sound discipline so that the required components are uniformly received in the assembly line.

(e) Institution of work studies: Work measurements help in the study of the capability of each machine so as to assess at what speeds and feeds the particular components will give an optimum output to the required tolerances. It is also the function of this production control organisation that no machine becomes idle and to that extent to find components so as to ensure on scientific and rational basis, full utilisation of the machines.

This Organisation aims at a considerable concentration of designing suitable jigs, fixtures, tools and jobs and evolve the best designs taking into account the concepts of accuracy, simplicity, strength, safety, economy for enforcing the mass production of materials and interchangeability of machinery parts.

An inspection wing under the same Production Control Organisation exists manned by one Shop Superintendent and one Senior Changan. Special inspection schedules are drawn up and implemented with reference to important datum lines, surfaces, for simple as well as elaborate stages, assembly and functional inspections in order to promote a stricter quality control of materials manufactured in this Shop.

All the consignee work orders are registered, raw materials are drawn and utilised under strict control, each operation for their production and timing is studied and job cards are issued

for Production. A close watch is kept on the manufacture at various stages and movement of jobs from one shop to another, and inspections are carried out before and during the progress of the job so as to ensure a stricter quality control and economy in production. 19

Delivery notes are issued against the completed works for despatch of the materials to the consignees, concerned.

The work orders position is periodically reviewed, monthly schedules for production are drawn up based on the loads, and a continuous watch on the receipt of work orders and their quick clearance is maintained.

FOUNDRY SHOP

The Foundry Shop is headed by a Shop Superintendent in the Gr.Rs.340-1040(R3) and assisted by a Senior Chargeman. A total staff of 136 are employed on production of various cast iron castings like the 'A' type foundations, trestles, rollers, roller guides, colour light units, roller segments, signal reverser and signal machine shells, electrical detector covers, bases and host of other materials in the ferrous section and brass cover and aluminium castings for signal lamps, electrical reversers, block instruments and electrical detectors in the non-ferrous section.

Out of the 17 & 23 highly skilled Grades I, and II, 5 and 13 are on the incentive scheme; similarly 27 skilled, 47 semiskilled and 32 unskilled staff are on incentive as against the total staff of 49, 64 and 46 in the respective categories.

The average turnover of production is 60 tonnes per month. The shop works in two shifts and is equipped with two cupolas, 2 overhead cranes, 2 fan blowers, 1 ground hoist, 3 moulding machines, 1 shot blasting furnace, 2 fettling drums, 1 surface and 3 pedestal grinders, tilting furnace and 1 loose sand mill.

The main moulding shop, Non-ferrous shop and fettling shop are situated close to each other, while the patterns, moulds and stores are housed in the adjacent sheds. The moulds are warmed up suitably by coal fed and lit ovens, so as to avoid any blow-holes to the products produced in the Foundry.

MACHINE SHOP

A Shop Superintendent in the scale of Rs.342-1040 assisted by three Charyemen looks after the various processes like the milling, drilling, shaping, slotting & planing the jobs in this Shop. All the castings and forgings required for the machining operations pass through this shop. Hundreds of parts required for electrical signal machines, colour light signals, electrical detectors, locking trays, Rack & Pinion and miniature levers, plungers of the lever frames, pins of cranks and compensators, studs of various types, trolley axle parts, are cut to various dimensions, tolerances, milled or drilled or shaped to sizes, slotted or machined to correct depth and girth. The production of various shops depend thus mainly on the efficient performance of this Shop.

The Shop is having 14 lathes, 3 planing machines, 4 shaping machines, 3 radial drilling machines, 4 slotting machines, 2 surface grinders, 3 hacksaw machines, 12 Milling machines, 3 grinders - in all 48 machines.

Of the total staff of 127 working in the section, 68 are on the incentive. 4 Highly skilled Gr.I, 16 Highly Skilled Gr.II are on the incentive working, against 7 and 21 respectively; 37 skilled against 83, 11 unskilled against 15 are also on the incentive which is being extended to cover some more. This Shop works in two shifts.

This group comprises of (i) Fitting Shop, (ii) Tool Room, (iii) Heat Treatment & (iv) Millwright Shops, working under an S.S. in the Gr.Rs.840-1040.

(i) Fitting Shop With a total strength of 85 workmen consisting of 9 Highly skilled Gr.I, 15 Highly skilled Gr.II, 20 skilled, 25 semiskilled, 16 unskilled out of which 9, 10, 20, 21 and 11 are respectively on the incentive, this Shop is looked after by a Senior Charyaman under the overall control of the Shop Superintendent.

Working in two shifts, this section deals mainly with the manufacture of lever frames, lock bar clips, lifting barriers, cranks of various types and sizes, compensators, circuit controllers, facing point locks etc., and assembly of mechanical items like the Siemens' point rodding, fittings, combined junction and track feed boxes etc.

This Shop is equipped with 7 drilling machines, 1 hand saw and 3 pedestal grinders to make it self-contained to enable a quick outturn of various processes involved prior to assembly of the manufactured items.

The outturn of this production shop is of the order of Rs. 4 lakhs per month.

(ii) Tool Room & Heat Treatment Section:

The Tool Room headed by an Assistant Shop Superintendent under the overall supervision of the Shop Superintendent, manufactures press tools, jigs & fixtures required for the machine shop, dies for the zincs in die-casting shop and forging dies for Blacksmith Shop, and gears for the electrical signal machines.

27 machines are installed in the tool room, comprising of a Jig Boring machine for precision jobs, band saw, gear hobbing machine one each, 4 centre lathes, 2 auto-lathes, 2 shaping, 2 milling, 2 die-sinking machines, 1 All cut, 2 Tool & Cutter grinders, 2 surface and 2 centreless grinders. 13

The ~~Heat~~ Heat-treatment section attached to the shop deals with annealing, case hardening, carburising, high speed steel hardening, tempering process and is equipped with 3 pit furnaces, 1 muffle furnace, 1 salt bath furnace and 1 pedestal grinder.

Both the sections work only in one shift. The staff provided in these two sections are :

Chargeman	..	1		
Highlyskilled Gr.I.	..	5		
Highlyskilled Gr.II	..	7	Semiskilled	.. 3
Skilled	..	20		
Unskilled	..	7		

(iii) Millwright Shop:

The Tool Room Asst.Shop Superintendent also deals with the work of this shop under the overall supervision of the Shop Superintendent of this group.

There are 224 machines working in the S & T Workshops, at an installed cost of Rs. 2 crores, approx. The primary function of this Shop is to maintain in perfect working condition all these machines, take up their periodical overhaul, replace and remove in time the wornout parts and to draw out the programme for the replacement of overaged and unserviceable machinery through the M & P Programmes and provision of a number of spare parts, and sufficient quantities of lubricants. Possession of a deep knowledge of the working of the machines, posting of adequate

14

strength of technical staff with a good know-how, mechanical dexterity, efficient and smart outturn, are as essential for successful working of this shop, as the compilation of technical literature and issues of up-to-date maintenance instructions, and a good supervision over the performance of the personnel attached.

The maintenance of lorry, van, 7 lister trucks, cranes are also entrusted to this shop, which has a total strength of 109 consisting of 6 Highly skilled Gr.I, 11 Highly skilled Gr.II, 30 Skilled, 19 Semiskilled and 25 Unskilled staff.

Back-saw, hand-saw, and drilling machine each, 1 grinder, 1 Kirloskar lathe, 1 diesel pump, 1 Kar crane, 3 compressors, 7 lister trucks (2 petrol driven, 3 diesel operated and 2 battery run) are under the control of this Shop.

The electrical portion of the equipment is maintained by one Electrical Chageman with suitable assistance under the overall control of the S.E.E./Shops, Lallaguda, and the Engineering works are looked after by the I.O.W./Lallaguda, under the overall control of IEN/S.W./MG.

Machinery & Plant Programmes

Every year some machines or other are proposed on 'age-condition' basis for replacement in the M & P Programmes. Additional machinery are also asked for to meet the ever increasing load and to undertake new jobs as a measure of expansion and diversification of production. Thus in M & P Programmes for 1978-79, 1979-80, 1980-81 and 1981-82 as many as 36 old and worn-out machineries are proposed for replacement and 4 new machineries asked for at a cost of Rs.23 lakhs, as detailed below

Sanction Nos M & P Programme 1973-79

			<u>Cost</u>	
CSTE's No. 1.	Air Compressor	.. Rs.	1,00,997-93	
SG. 242/7/	2. Power Hammer 530 Kgs.	.. Rs.	3,74,926-05	)
II dated	3. Elevating type Platform truck			)
6.8.79.	(Diesel)	.. Rs.	29,923-00	) Machinery
	4. Wood Planing machine	.. Rs.	29,827-10	) are awaited.
	5. Arc Welding machine	.. Rs.	34,999-52	)
	6. S.S. & S.C. Lathe	.. Rs.	99,987-56	)
No:81644/	7. Time Recording Clocks - 9 Nos.	.. Rs.	36,000-00	)
MC dt.19.2.79				

of Dy.CSTE/MFT. M & P Programme 1979-80

No:83039	1. Wood sawing machine	.. Rs.	39,835-35	) Requisitions
of 27.7.79	2. Welding Transformer	.. Rs.	35,550-44	) released and
Dy.CSTE/	3. Pillar Drilling machines 3 Nos.	.. Rs.	16,662-34	) machinery
(S)MFT.			each.	awaited.
CSTE's	4. Capstan Lathe	.. Rs.	99,944-03	)
No:SG.	5. Radial Drilling Machine	.. Rs.	92,922-40	)
242/7/12	6. C.P. Compressor	.. Rs.	97,851-64	) ..do..
of 25.9.79.	7. Bolt Threading Machine	.. Rs.	59,466-46	)
	8. Eccentric Press	.. Rs.	74,151-93	)
	9. Aquith Drilling machine	.. Rs.	59,466-46	)

M & P Programme 1980-81

1. Rotary surface grinder	Rs.1,00,000/-	) CME/SC has forwarded
2. Capstan Lathe	Rs.1,50,000/-	) the proposals for
3. Hydraulic Press	Rs.1,00,000/-	) these machines, duly
4. Radial Drilling Machine	Rs.1,15,000/-	) concurred by FMCAO/SC
5. Pneumatic Power Hammer	Rs.4,50,000/-	) to Railway Board.
6.*Quasi Arc Welding Machine	Rs. 50,000/-	

* Concurred by FMCAO as per CSTE/SC's No.SG.242/7/13 of 10.8.79 but not sent to the Board.

M & P PROGRAMME 1981-82.

16

Proposal for the following machines duly concurred by the S.A.O. (S&W) LGD, is sent to the C.S.T.E./SC.

Addl.	1. Pneumatic Power Hammer 1 ton cap.	Rs. 6,00,000/-
Repl.	2. Engraving machine	Rs. 20,000/-
	3. Electrical Hoist	Rs. 20,000/-
	4. Cupola 4 tons capacity	Rs. 35,000/-
	5. Centre lathes - 6 Nos.	Rs. 50,000/- each
	6. Capstan lathe	Rs. 1,25,000/-
	7. Horizontal Milling Machine	Rs. 2,00,000/-
	8. Milling Machines - 2 Nos.	Rs. 2,50,000/- each
	9. Polak Pressure Die Casting Machine	Rs. 7,00,000/-
	10. Air Compressor.	Rs. 2,25,000/-

(iv) RECEIPT & DESPATCH SECTION :

This section works under the control of a Chargeman under the overall administration of the group Shop Superintendent. Staffed by 79 members - 1 semiskilled, and 78 unskilled, this section deals with the collection and distribution of raw materials for various shops, coal, coke, moulding materials, bricks and plumbago powder etc., for the Foundry, C.I. and copper scrap for moulding shop, and gathers and despatches the finished products by wagons, or parcels, loads or unloads scrap from all the Shops and despatching it by road or rail to the scrap depots. The work of maintenance of neatness and cleanliness of all the premises of the S & T Workshop, gardening and care-taking of the shops is also entrusted to the care of this section.

ELECTRICAL GROUP

17

This group comprises of the production and overhauling wings and is headed by a Shop Superintendent in Gr.Rs.840-1040.

The production wing consists of (i) electrical fitting, and painting (ii) electro-plating and die-casting, (iii) electrical signal lamp and (iv) track recording car sections. The overhauling wing embraces the sections of (i) the Block, Signal machines & reversers, (ii) Relays, (iii) wayside station selectors, and (iv) teleprinters.

Electrical Fitting Shop: This shop deals with the assembly of 20 Nos. per month of Signal machines, electrical reversers 60 Nos. and 30 electrical detectors, besides the manufacture of circuit controllers, colour light transformers, panels for panel interlocking in way side stations. Coil winding work and repairs to electrical point machines are also undertaken in the Shop. The production is of the order of Rs.1.90 lakhs per month.

Test benches have been provided to simulate the rigid field conditions and test the electrical reversers and signal machines, during and after their manufacture. 2 coil winding, 3 drilling and 5 Praga Drilling machines, besides 3 centre lathes, 1 engraving machine and 3 tool grinders have been installed and attached to this Shop to facilitate drilling, milling, shaping, coil winding and engraving operations being carried out in the shop itself.

A small electroplating section is also attached to this section for electroplating components required in various signalling equipments. Cadmium, copper, nickel and

chromium plating is done in earmarked tanks, and polishing, and buffing machine is provided besides a polishing barrel (oblique).

The Shop Superintendent is assisted by a Chargeman, 81 members of staff comprising of 7 Highly Skilled Gr.I, 12 Highly skilled Gr.II, 33 skilled/semi-skilled and 18 unskilled staff against which 7, 10, 19, 6 & 8 respectively are on the incentive.

For A.D.cells besides the manufacture of zincs, filling up of oil in bottles and caustic soda in packets is undertaken so that quality soda and oil without any adulteration are supplied to the consignees for setting up dependable primary cells.

Painting shop is also attached to this section for spray and hand painting of all electrical gears, colour light signals & lamps, block instruments, panels, terminal boards, besides painting of signal machines, reversers, detectors, block instruments, electrically lit lamps, sign writing of boards, name plates and station diagrams on panels.

ELECTRICAL SIGNAL LAMP SECTION

A small production shop has recently been opened as a new development project for the manufacture of low wattage electrically lit signal lamp to be used with the existing semaphore signal. The use of the electrical signal lamp has resulted in considerable savings of kerosene and also in making the signal light indication visible from a long distance contributing to a faster and safe rail travel. Daily manual lighting of the kerosene lamps on the signal lamps will soon be avoided, as the twilight switch provided on the electrically lit signal lamp will automatically switch on the lamp when the intensity of darkness comes to a pre-determined level as in the evenings and in cloudy or foggy environments, and

will switch off when the intensity of the natural light reaches a certain level in the mornings.

The section is manned by a Telecommunication Inspector, assisted by three skilled artisans, in the assembly of lamps and the production of this item is 100 per month, at a cost of Rs. 35,000-00.

DIE-CASTING SHOP

A production shop for the manufacture of AWC-2 zincs for AD cells by pressure die-casting machines, and AW-4 zincs by gravity die casting has been functioning since the year 1968-69. There are two machines one of type FKM-120 supplied by M/s. Pioneer Equipment Co., Baroda, producing 500 zincs per day and the other 'POLAK' machine manufactured by a Czechoslovakia firm, producing a single zinc of 200 pieces per day. The hand dies produce about 400 pieces of AW-4 for lechlanche cells. Initially the production which was of 15,000 pieces per year now has reached about 2 lakh pieces within a span of 8 years. But power failures and machine failures due to ageing have undermined the production and every effort is being made to keep upto this level.

The cost of production works out to Rs.2.03 lakhs per month.

A 5-ton Hydraulic press for trimming operation of these zincs and the other accessories for the process of chipping, amalgamation, tinning and wax-coating are all equipped.

The M & P programme envisages the replacement of POLAK machine on age-cum-condition basis by one modern machine which can produce two pieces at a time in one injection.

66 members of staff are employed in electroplating and die-casting sections with 4 Highly skilled Gr.I, 4 Highly skilled Gr.II 15 skilled, 32 semiskilled and 11 unskilled out of which 2, 3, 8, 14 and 6 are on the incentive.

TRACK RECORDING CAR SECTION.

With the accent on the introduction of more and more high speed trains and intensity of fast passenger expresses, continuous recording of the parameters of the track under dynamic conditions became a paramount necessity. It was not previously possible to measure the geometry of track under running conditions nor locate the bad patches falling short of the standard specification. The Indian Railways imported in the year 1960, a mechanical track recording car for B.G. lines and subsequently decided to manufacture a proto-type with the indigenous know-how. The design work was done by the Research, Designs and Standards Organisation, Lucknow, and this S & T Workshop was chosen to manufacture the car.

The first mechanical Track Recorder was turned out by this shop in the year 1968, availing the assistance from a number of sister organisations like the Defence Research & Development Laboratories, Bhabha Atomic Research Centre, National Aeronautical Laboratories, and Defence Metallurgical Laboratories etc. This car was put into an extensive use to record the track parameters between Howrah and Delhi ~~may~~ before the introduction of the Rajadhami Express on the 1st March 1969. 3 more B.G. and 1 M.G. Mechanical track recording cars were manufactured in quick succession after the first prototype was found to be highly successful.

Owing to the limitation of mechanical Track Recording Cars to measure the track geometry beyond a speed of 100 KMPH, the manufacture of 2 B.G. and 1 M.G. electronic track recording cars was undertaken by this Shop and delivered to the R.D.S.O. for measuring the gauge, unevenness, alignment, twist, cant, speed

and reference marks besides checking up the gauge levels, alignment curves, super-elevation - the parameters so essential for high speed running.

The approximate cost of these seven cars came to Rs.70 lakhs inclusive of the cost of carriages. Considerable saving in foreign exchange was achieved besides training a band of diligent workers in this sophisticated technological venture.

A full-fledged workshop has been set up for taking up the overhaul of the instrumentation of the track recording cars in this workshop by providing 1 centre lathe, and a machine each for drilling, shaping and slotting processes. An Wolf Tool grinder is also added.

The technological advances in electronics are so fast sweeping that the work connected with the manufacture of electronic track recorders has become almost a developmental work and both the R.D.S.O. and the S & T Workshops have to keep themselves in regular touch with this fast changing technology so as to introduce sophisticated techniques and innovations to manufacture more and more reliable equipment and to measure accurately the actual track parameters in the field.

A modest staff strength of 12, consisting of 3 Highly skilled Gr.I, 1 Highly skilled Gr.II, 4 Skilled, 2 semiskilled and 2 unskilled works in this section, and against this, 3, 1, 4, 2 and 2 hands respectively are on the incentive.

The maintenance wing for overhauling of teleprinters and wayside control selectors is under the charge of a Telecommunications Inspector Gr.II, under the overall supervision of the Shop Superintendent/'E' Group. He is assisted by 10 workmen, consisting 5 Highly skilled Gr.I, 1 Highly skilled Gr.II, 1 skilled, 1 semi-skilled and 2 unskilled, against which 3, 2, 1, 1 and 1 of the respective cadres are on the incentive.

On this Railway 49 teleprinters are in use and at the rate of overhauling for every six months, the number of machines to be overhauled work out to 6 per month. There are again nearly 1000 wayside station selectors and all of them have to be overhauled every _____ months. A modest target of 2 teleprinters and 50 Nos. of selectors per month is laid down and being adhered to. More machines could not be taken up for overhaul due to the non-provision of sufficient number of spare machines to release those due for periodic overhaul and insufficiency of staff strength, which are also being utilised for production of 100 Nos. of electrically lit signal lamps per month. The section also deals with the testing of circuitry for punching clocks and sirens in the Shop. Test benches have been provided to test the overhauled teleprinters and wayside station selectors duly simulating the exacting field conditions.

BLOCK INSTRUMENT OVERHAULING SECTION

Another maintenance section exists for the repairs of 5 signal machines, 10 electrical reversers per month and for taking up as a statutory obligation, the periodical overhauling of Neales Voucher, Ball token, tablet instruments, S.G.E. double line block instruments at the rate of 15 Nos. per month. A test bench for testing the overhauled instruments and repaired equipments has also been provided besides a Kirloskar Lathe, a drilling machine and a grinder for milling, drilling, and grinding of parts required in this Shop.

This section is under the charge of a Sr.Chargeman, assisted by 16 members of staff consisting of 3 Highly skilled Gr.I, 6 skilled, 3 semiskilled and 2 unskilled against which 2, 6, 4, 1 of the respective cadres are on the incentive.

RELAY SECTION: deals again as a statutory commitment with the overhauling of all shelf-type relays extensively used in all the electrical signalling installations on the Railway. Headed by a C.S.I. and assisted by a complement of staff of 3 Highly skilled Gr.I, 3 Highly skilled Gr.II, 4 skilled, 3 semiskilled and 2 unskilled against which 3, 3, 5, 2 & 2 numbers of the respective cadres are on the incentive. 100 relays per month are regularly overhauled and delivered after subjecting them to severe test.

MECHANICAL FABRICATING SECTION

This section works under the Principal Foreman and consists of Blacksmithy shop, Carpentry Shop and Fabricating Shop; the last one comprising of welding, tinsmithy and rivetting sections.

The Blacksmithy Shop is equipped with 3 threading, 1 each of drilling, bolt making and flash butt welding machines, 4 pneumatic hammers, 2 drop stamps, 4 oil furnaces, 2 blowers, 1 tool grinder, 1 pneumatic hammer (steam/compressed air), and provided with a strength of 126 numbers of staff comprising of 10 highly skilled Gr.I, 12 Highly skilled Gr.II, 27 skilled, 62 semi-skilled, and 15 unskilled against which 6, 10, 24, 54 & 15 members respectively are on incentive. This processing Smithy shop manufactures all the forgings required for various signalling items like the lock bar clips, front & back clamps, rocker arms, Siemens roddings required for Siemens Point Machines, Point roddings, solid & flush joints, and forgings required for electrical reversers etc.

The Carpentry Shop attached to this section is manned by an Asst. Shop Superintendent, and 40 members of staff - 4 in Highly skilled Gr.I, 6 in Highly skilled Gr.II, 14 skilled, 7 semiskilled and 9 unskilled. Provided with a wood sawing machine, log saw machine, 2 circular saws, planing machine, mortising machine, emery grinder, ordinary grinder, cutter grinder, wood lathe, this shop manufactures block counters, T.W.shelves for battery boxes, furnitures like office tables, chairs, drawing tables & stools for the S & T and other branches, ticket counters for the booking offices and the patterns for the moulding shop. Of late the cases for packing of zincs (ANC-2 and AW-4) and other sophisticated and delicate equipments produced by S & T Shops, are also manufactured instead of drawing them from Trade.

The production works out to Rs.4.0 lakhs per year.

FABRICATING SHOP: Working under the control of one Asst. Shop Superintendent under the overall supervision of the Principal Foreman, this shop is equipped with the spot welding & sheet cutting machinery, 5 eccentric presses, 2 fly presses, 2 Hydraulic presses for the Press section which deals with the manufacture of phenolic mouldings, pulley wheels, brackets, cross arm channels, ventilators for GKP and sheet iron battery boxes, strips for the zinc elements, M.S.liners for engineering department.

In the principal Rivetting section, 7 drilling machines, 1 blower, 1 plate bending, 1 folding, 1 universal swaging, 1 guillotine shearing, 1 circle cutting, 1 profile cutting, 1 metal sawing, 1 triple combination punching, 1 punching and

shearing machine, 1 blower, 1 grinder, 1 Hydraulic Press (450 tonnes), 1 air compressor, 1 fly press - in all 24 machines are installed. The production is extended to the Fabrication of D.W. Compensators, Gorakhpur & Sheet Iron Battery boxes, lifting barrier booms, lock bars, pedestals and panels, for way-side station, station diagrams, water tanks for the Engineering Branch, T-Joints of various types and makes for the R.E. Organisation; their outer and inner cases, and outer cases of electrically lit signal lamps.

The production is of the order of Rs.3.0 lakhs per month.

Total staff strength is 133, consisting of 11 highly skilled in Gr.I, 16 in Highly skilled Gr.II, 32 skilled, 40 semi-skilled, 34 unskilled against which 8, 10, 20, 29 and 19 members respectively are covered in the incentive scheme.

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The scheme of promotions prevailing in the S & T Workshops is that upto the cadre of Maistries, the shop seniority is reckoned and general seniority from above the rank of Maistry for promotion to Chargeman, Assistant Shop Superintendent, and Shop Superintendent cadres. The Basic Training Centre has to provide for the training of the shop workers not only to acquire the necessary skills and expertise in their own vocation, but also in other trades so as to give them the technical know-how and a capability for shouldering higher responsibility.

2. As per the recommendations of the Technical Training Committee constituted in the year 1955, the training of the semiskilled and unskilled staff is made a statutory obligation. In the year 1975, under the 20-point crash programme, a full-fledged training centre was set up and as many as 120 Apprentices under the Apprentices Act were given training in various trades like Welding, Rivetting, Fitting, Machine Operating, Moulding, Blacksmithy, and Carpentry from the year 1975-76 to 1979. With the closure of this Act Apprentice Training Centre, the facilities that were already available are proposed to be utilised for imparting training to 50 of the unskilled and semiskilled categories of the workshop staff per year in various trades.

3. The syllabi framed by the Director-General of Employment & Training, New Delhi, for the trades of Machinist (Miller), Machinist (Shaper), Machinist (Solder), Machinist (Planer), Machinist (Grinder), Blacksmithy, Turner, Carpenter; etc. are programmed to be followed duly incorporating the changes necessary to suit the manufacturing processes and methods

available in the S & T Workshops, besides framing suitable syllabi for die-casting, rivetting, fitting, electroplating, mechanical & electrical signalling, block, teleprinter & way-side station Selectors overhauling programmes, etc.

4. The posts of 1 Jr. Instructor in Gr.Rs.425-700(RS), 2 Jr.Instructors in Gr.II, Rs.380-560(RS), and 1 Junior Clerk will form the establishment of the training centre, to start with.

5. OCTV is proposed to be added to this Basic Training Centre so that demonstrations on the TV on live and working equipments available in other Shops can be given without the need for shifting to and installing such heavy machinery in the training centre.

6. Other facilities like the 16 mm Projector and Gestetner for roneoing (cyclostyling) the lessons required by the staff will soon be added to make the training centre full-fledged.

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STAFF WELFARE ACTIVITIES

A Welfare Inspector in Cr.Rs.550-750 has been sanctioned inter alia to look after the staff grievances, general cleanliness, drinking water supply arrangements, Staff Benefit Fund works, and individual staff representations for consideration by the Administration.

CANTEEN :

There is a staff canteen statutorily established and staffed by a Manager, an Assistant Manager, three cooks, and 11 cleaners & vendors, to serve tea and snacks inside the shops during tea times and lunch to the staff at lunch time at subsidised rates, which are far below the rates obtaining in other railway canteens. All the costs like fuel, wages of canteen staff, cost of supply of water & electricity, accommodation, etc., are borne by the Administration. The Welfare Inspector receives the subsidies and arrange their payment.

There are 20 decolam topped tables and 50 chairs provided in the Canteen, which is having a spacious hall for the staff to take lunch.

There are four tiffin/lunch rooms and one rest room with sufficient accommodation for the staff to take rest after lunch. 15 tables with stone-slab tops and 32 wooden benches have been provided in these rooms.

RECREATION FACILITIES:

P.A.system through two horn type speakers kept on the main office building relays the music and workers' programmes during the lunch period for the entertainment of the staff.

One Philips 3-band radio, one Philips 35 W Amplifier, 2 Record players, 2 horn type speakers, 205 Hindi, Telugu and Tamil records are available for playing. The P.A. system is being expanded and extended to cover the entire shops also for the benefit of the staff who do not take lunch in the tiffin rooms or in the canteen.

There is a Cultural and Sports' Association functioning with membership from the staff of the workshop. It conducts various cultural programmes like music, dance, dramas and variety entertainments. There are a few South Central Railway players and athletes among the staff of this workshop, and every encouragement is given to the promising talents.

MEDICAL ATTENTION:

An Ambulance Room is attached to the workshop and is manned by a part-time A.D.M.O. drawn from the Lallaguda Hospital, one full-time staff nurse, one dresser during the day time, and a dresser in the night time. The various sections in the Shops are having first-aid boxes at various points and good number of staff have been trained in rendering first aid. The Ambulance Room attends to all cases of injuries and sicknesses, and renders first-aid to the workers. Serious cases are immediately referred to the Hd.Qrs. Hospital, which is closeby.

For the workers engaged in hazardous assignments, supply of multi-vitamin, iron tablets and other health-giving medicines are supplied free of cost.

A free Homoeo dispensary is also functioning, which is run by a Senior Clerk of this workshop who is qualified in Homoeopathic treatment. The staff as well as their families in the colony

nearby take full advantage of the diagnosis and treatment from this dispensary, which is very popular in the locality.

LIBRARY:

Apart from a well-equipped technical library in the Shops, a Hindi Library consisting of good collection of Hindi books is run. Staff as well as Officers derive the benefit of Hindi Teaching Scheme by attending the classes conducted at Rail Nilayam and at the Workshop premises.

GENERAL INSURANCE & BENEFIT FUND:

All the workers in the workshop are covered by the General Insurance Scheme sponsored by the Government.

All the workers and other staff of this workshop are members of the Workmen's Benefit Fund and contribute a sum of Rs.3/- per month. At the time of retirement or death, a consolidated amount of Rs. 1,200/- is payable.

FIRE STATION:

A fire station exists inside the Shops which is manned by an Inspector and Rakshaks, and it is suitably equipped to deal with all sorts of fires. Some of the staff of the workshop are also trained in the fire-fighting techniques.

FACE-LIFT TO SHOPS:

31

As environmental hygiene and neatness of the Shops as well as beautification of the premises have a bearing on the health and physical fitness of the staff, every effort is being made to keep the shops spick-and-span, to lay a nice garden and to keep the premises well ventilated and attractive. The finished products accumulated in the Shops are periodically shifted to create more space for the workers to work more comfortably, and all scrap materials scattered hitherto and the materials both finished and raw materials which were left at different shops are periodically shifted to the earmarked locations.

The pathways leading to the various shops and offices have been concreted for free movement of materials, men and vehicles like the van, lister trucks and lorry.

Independent lockers in the wooden racks are provided to the different sections for the staff to keep their clothes and personal effects, before getting ready to work, inside the shops.

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S A L I E N T F E A T U R E S
O F

32

SIGNAL AND TELECOMMUNICATION WORKSHOP
NETTUCUDA

- From 1920) Started as an Engineering Workshop with 200 workmen
to 1950) for the manufacture of steel sleepers, points and
crossings for the P-Way, R.C.C. beams, bricks &
flooring slabs and lavatories for the Civil Engineering Section.
- 1951 Went under the control of B.E., Manned. Nucleus section for repair and maintenance of the S & T items started.
- 1956 S & T Branch of the Central Railway took over the Shops and first expansion programme started.
- 1960 Mr. Manne Terelius - Swedish Expert studied the working of S & T Shops and submitted a report on the production of electrical signalling items.
- 1961 Production went up to Rs.28 lakhs.
- 1964 Mr. Toshio Watanabe, a Japanese Production Expert stayed with the Shops for 6 months and suggested ways and means to utilise the full capacity for production.
- 1965 South Central Railway was formed. R.C.C. Shop was transferred to the Engineering Workshop and size of Carpentry shop reduced, and surplus staff transferred to Mechanical Workshops, Lallaguda.
- 1966 Production of Track Recording Cars started.
- 1969 Workshop developed the technical know-how and technique for production of ANC-2 Zinc Elements.

1972	Sections for overhauling of Relays, Block Instruments and wayside station selectors opened.		
1974	Commenced manufacture of materials required for the Railway Electrification and line communication works.		
1975	Stepped up production of zinc elements to meet the needs of all the Zonal Railways.		
1974-75	Outturn crossed over Rs.100 lakhs mark.		
1975-76	Production reached Rs. 158 lakhs.		
1976-77	"	"	Rs. 165 "
1977-78	"	"	Rs. 173 "
1978-79	"	"	Rs. 166 "
1979-80	"	"	Rs. 164 "
STAFF : (a) Officers			
	.. {	J.A. Grade	.. 1
		Sr.Scale	.. 2
		Jr.Scale	.. 1
(b) Workshop staff		1158	
(c) Office/Drawing Office/Jig & Tool Design Office:		196	
Total area occupied by the S & T Workshop	..	35,000 Sq.metres.	
Total covered area of the workshop	..	12,500 " "	



SIGNAL & TELE-COMMUNICATION WORKSHOPS

METTUGUDA S. C RAILWAY.

SEPTEMBER 1980